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On behalf of the National Earthquake Prediction Evaluation Council (NEPEC), I am writing to provide you with the Council's perspective on the current status of the Working Group on California Earthquake Probabilities (WGCEP) project to reassess the probabilities of future earthquakes in California. As you are aware, the WGCEP is a joint undertaking of the U.S. Geological Survey, the California Geological Survey and the Southern California Earthquake Center with support from the California Earthquake Authority. It is intended that the results of this project will provide the basis for the time-independent characterization of earthquake hazard to be used in the USGS National Seismic Hazard Map (NSHM), and as a time-dependent model to be used by the California Earthquake Authority in setting rates for residential earthquake insurance. USGS requested that NEPEC provide advice on this project as NEPEC has done for previous incarnations of the WGCEP in 1988 and 1990. Completion of the time-independent phase of this project is planned for September of this year, and a first draft of the NSHM based on this model is due to the Building Seismic Safety Council by February 15.

The WGCEP has prepared a preliminary draft report on the time-independent aspects of this project for review by the Scientific Review Panel (SRP) established for this purpose. A meeting was held in Menlo Park on January 17th to discuss the report. In attendance were members of WGCEP, the SRP (two of whom are also members of NEPEC) and three additional members of NEPEC as observers. The SRP has prepared a written review of the status of the project. NEPEC has been briefed on the SRP report. Based on a discussion of that briefing, as well as the participation of the NEPEC members involved, NEPEC has the following observations.

NEPEC is satisfied that the review process being carried out by the SRP is an appropriate and professional effort in which the USGS and other stakeholders can have significant confidence. The SRP report indicates a number of issues for the WGCEP to address over the coming months, and NEPEC agrees that the issues identified in the SRP report must be addressed. Among these are the following issues of particular concern:

- NEPEC believes that it is important for the credibility of these efforts that the time-independent models of WGCEP and the California portion of the NSHM be essentially the same. It appears that a path forward has been identified among the WGCEP and the USGS group responsible for the NSHM to provide the basis for preparing a draft map to meet the February 15th deadline. NEPEC believes that the identified path is appropriate. NEPEC wishes to emphasize that this close coordination and cooperation must continue through the September date for completion of the California time-independent model and the final NSHM. Additional changes made to the WGCEP model must be coordinated with the NSHM and vice versa, such that the two models are essentially the same at the conclusion of the process.
- NEPEC recognizes that the time-independent model prepared by WGCEP will form the basis for their further efforts to develop a time-dependent model. NEPEC is of the view that while the time-dependent model may have some additional aspects that do not arise directly from the time-independent model, simplicity will be a great virtue and the extent to which the time-dependent model flows directly from the time-independent model will add to its credibility and acceptance. Simplicity also seems to be required to meet the demands of the schedule.
- One key test of both time-independent and time-dependent models is the extent to which the models predict the rates of earthquakes actually observed. A persistent problem with past models, and the current WGCEP model, is that these models over-predict the rate of earthquakes near magnitude 6.5 relative to the rate observed over the past century and a half. An important goal of the WGCEP should be to increase the agreement between the model and the observations. In this regard it is critical that the earthquake catalogs being used for the test be well reviewed and reflect the best understanding of the earthquake history of California. NEPEC urges that WGCEP resolve outstanding disagreements about the catalog, and that it improve the model insofar as possible to achieve agreement between observed and predicted rates of earthquakes for all magnitudes.
- NEPEC urges that the WGCEP's Management Oversight Committee assure that the concerns of the SRP have been met before accepting the results of the project. While NEPEC endorses the review process in which the SRP provides the primary technical review of the WGCEP report, NEPEC's endorsement of the result will depend on the degree to which the concerns raised in the SRP review are addressed.

Although many important issues remain to be resolved in the course of this project, NEPEC believes that, at this point, it is essentially on track and that the review process in place is sound. NEPEC envisions that it will be kept abreast of future developments and will provide you with additional updates as appropriate. In this regard NEPEC understands that discussions are underway within USGS about whether NEPEC will have any role in reviewing the NSHM as it nears completion.

Please let me know if you have any questions about these observations.

Sincerely yours,

James H. Dieterich, Chairman
National Earthquake Prediction Evaluation Council